

## PAPER

# Digital Pathways to Autonomy: Exploring Moodle-Based Activities in TEFL

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## ABSTRACT

This study examined the role of technology in fostering learner autonomy in EFL classrooms compared to traditional teacher-centered methods. It specifically explored students' perceptions of technology in promoting autonomy and teachers' views on their role in supporting autonomous learning through technology. A mixed-method design was employed, integrating quantitative and qualitative approaches. A questionnaire was distributed to investigate the impact of technology on learners' autonomy, while semi-structured interviews were conducted to capture learners' experiences with Moodle-based activities and teachers' perspectives on their role in fostering autonomy. Findings revealed that technology, particularly Moodle, significantly supports learner autonomy by providing flexibility, access to diverse resources, and opportunities for independent problem-solving. Learners expressed positive attitudes toward Moodle-based activities, preferring them over traditional approaches. Teachers emphasized their role as facilitators, guiding learners through structured tasks and providing scaffolding to promote self-directed learning. Overall, the study highlights the effectiveness of technology in enhancing learner autonomy and suggests practical implications for integrating Moodle and similar platforms into EFL teaching practices.

## KEYWORDS

EFL learners, autonomy, moodle-based activities, EFL learning environments

## 1 INTRODUCTION

Technology serves as a gateway to global education that aims to promote democratic values of equity and equality, especially during the digital age led by the “digital natives.” Generation Z, or the “digital natives,” need to be equipped with the knowledge, skills, and values necessary to navigate and help build a better world. Giving learners the voice and choice to participate in knowledge creation requires rethinking how learner autonomy is approached and the role of technology in EFL learning environments.

Abuhussein, H. F., Rafidi, T. J., Morrar, N., Abdallah, A., Abu Thabet, E. A. H. (2026). Digital Pathways to Autonomy: Exploring Moodle-Based Activities in TEFL. *International Journal of Interactive Mobile Technologies (iJIM)*, 20(18), pp. 46–70. <https://doi.org/10.3991/ijim.v20i18.62623>

Article submitted 2026-05-11. Revision uploaded 2026-06-16. Final acceptance 2026-06-23.

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The traditional education model centers on the teacher as the primary source of information for students. In the classroom, students are passive listeners expected to absorb knowledge. In contrast, fostering learners' autonomy has become a vital goal in modern education, especially in language learning. It involves intentionally shifting from teacher-centered methods to approaches that enable students to take control of their own learning. According to [36], learner autonomy is a crucial factor in promoting effective knowledge transfer and increasing motivation and engagement. Additionally, integrating technology provides access to diverse resources that expand learning opportunities, allowing students to direct their own language development [36]. Similarly, [45], who introduced the concept of "digital natives," argued that embedding technology into education is essential in the digital age—necessary, not optional—as it helps customize the learning experience to meet students' needs, making its use vital and meaningful.

However, empirical pedagogical implementation that addresses students' needs and preferences regarding Moodle-based activities in EFL learning environments is underrepresented in some countries due to insufficient sources and in-depth empirical research. This highlights the urgent need to engage students, teachers, and institutions in updating curricula and preparing students for digital transformation. This study aims to explore the importance of Moodle-based activities in addressing students' perceptions towards promoting autonomy in EFL classrooms in Palestinian universities. It examines how digital platforms, especially Moodle, may empower EFL learners to take better control of their own learning, thereby boosting motivation and enhancing their learning autonomy and self-regulation.

Despite growing research on learner autonomy in the Middle East, most studies focus on students' perceptions and readiness rather than on how autonomy driven by hands-on, meaningful experiences and practices is applied in actual learning settings. For example, [1], [2] examined Palestinian university students' readiness for autonomous learning and the level of instructional support from teachers, concluding that students are more likely to learn independently when given appropriate opportunities and guidance. As a result, a clear research gap remains regarding how to enhance autonomy through specific pedagogical and technological strategies in meaningful educational settings. This gap is particularly evident in digitally mediated learning contexts, especially at Palestinian universities. Addressing this, the present study is novel because it goes beyond perceptions to examine the actual implementation of strategies that foster autonomy through digital tools, in line with a Palestinian university's digital transformation strategic plan that seeks to apply and engage all stakeholders. By linking learner autonomy to institutional digital initiatives, this study makes an empirical contribution to both autonomy research and the growing field of technology-enhanced higher education locally and internationally. Indeed, granting learners opportunities, voice, and choice to participate in knowledge creation and production requires rethinking how we approach learner autonomy and the role of technology in EFL learning environments.

## 1.1 Research problem

For EFL teachers, a key concern is how to boost their students' autonomy and self-regulated learning through modern technological tools and platforms. Despite the widespread use of these platforms, it remains unclear how these tools can enhance EFL learners' independence and support their long-term language development in

a private university in Palestine. This study aims to examine how Moodle-based activities affect learners' autonomy and the factors that influence their effectiveness in helping EFL students manage the English learning process independently.

## 1.2 Research questions

1. How does the use of technology in EFL classrooms and Teacher-Centered Lessons influence learners' autonomy at statistical level  $\alpha = 0.05$ ?
2. What are students' perceptions of the role of technology in fostering learner autonomy in EFL learning environments?
3. What are teachers' perceptions of their role in supporting EFL learners' autonomy through technology?

## 2 LITERATURE REVIEW

### 2.1 Theoretical framework

In the context of learning autonomy, both cognitive theory and humanistic psychology emphasize the active role of learning in constructing meaning while reflecting on experiences. Cognitive learning theorists on learners' autonomy, such as Rousseau and Dewey, focused on the learners' responsibility, experiences, social participation, and problem-solving skills as key characteristics of autonomous learners. These include learning strategies, metacognitive, cognitive, and social-affective strategies that aid learners in their active task approach and awareness of the learning process [16], [48]. Likewise, humanistic psychology also grants focused attention to personal growth. For instance, [48] explores influential humanists, such as Carl Rogers, specifically in redefining the teacher's role as a mediator of autonomy in language learning. Students must be motivated and driven by their interests, desires, self-evaluation, and personal choices to learn in a healthy environment that can foster autonomy. It can be included that the integration of theoretical perspectives enables potential expansion of their knowledge, especially when granted the voice and choice to make sense of their learning in a rich academic digital environment [29], [50].

Learner's autonomy is also a fundamental principle of the constructivist theory [48]. The principles of sociocultural theory are grounded in Vygotsky's [61] constructivist theory, which supports social interaction and a participatory approach within a cooperative learning environment. This educational interaction enables learners to sharpen independent thinking and self-directed learning in a cooperative learning environment that scaffolds engagement and helps them internalize meaning. In addition to cognitive and humanistic theories, social-cultural theory focuses on learners, peers, and the community of learning that supports language practice through social and cultural tools [61]. These tools are essential to the development of language and transfer of knowledge from one context to another, granting more opportunities for learners to be autonomous in meaningful contexts. [60] argues that learner support is not solely teacher-directed. Learners could seek assistance from more capable peers or adults in their environment. Interaction and dialogue facilitate learners' comprehension of instructional content as they internalize information, guide their actions, and acquire new competencies in self-regulating the learning process [3].

To conclude, cognitive theory, humanistic psychology, and Vygotsky's sociocultural theory provide multifaceted support for learner autonomy by amplifying learners' role as agents. Together, these perspectives emphasize that autonomy is fostered and cultivated by creating a community of learners who have the opportunity to participate in learning environments through reflective practice, shaped by contextualized experiences within an authentic learning environment.

## 2.2 Learner's autonomy in language learning

[74] defines autonomy as an individual's competence in independently managing and regulating their educational development. It is acquired within a classroom learning context or through granting opportunities for students to produce knowledge. Furthermore, according to [3], literature supported by [74] emphasizes that learners need to be independent and self-regulate their personal learning process by taking ownership of accountability for decisions regarding their learning choices and strategies, including their proficiency in utilizing hierarchical metacognitive techniques.

Other definitions viewed learner autonomy from several dimensions and within different contexts by focusing on interdependence and independence. For example, [30] confirms what Holec explored regarding the nature of the concept of autonomy as a process that is considered an unsteady stage that learners need to achieve. In other words, learners are able to adapt and scaffold their self-autonomy depending on their personal needs and decisions. Therefore, achieving autonomy is a process that is internalized by learners and varies based on the different contexts they experience during the process of learning. This entails that learners also encounter challenges to become autonomous. However, Little's view of learner autonomy is juxtaposed with that of Holec's [72] in their emphasis on interdependence and overdependence [3].

Scholars [8], [62] have explored the connection between autonomous learning and the learner's self-confidence, which refers to their ability to self-regulate their own learning to succeed academically. Likewise, others [40] consider self-confidence a key factor, specifically in fostering both extrinsic and intrinsic motivation. Additionally, [4] emphasizes that the increase in self-confidence leads to a positive impact on learners' engagement and learning.

## 2.3 Teachers' role

In traditional teacher-centered classrooms, the teacher is the main provider of intellectual content and informational resources, which could hinder fostering learners' autonomy [18], [33]. Some researchers [14], [26] argue that instructors are expected to be facilitators and provide a language learning environment that fosters autonomy, motivation, and self-directed learning [26], [28], [38]. Moreover, teachers are required to promote technology-enhanced autonomous language use and offer instructional scaffolding and guidance for effective engagement [43], [67]. Additionally, teachers should equip learners with tailored resources and guided methodologies that empower them to become independent learners [53], [27]. Through autonomous learning, students are granted the opportunity to self-assess, reflect, and set goals [25], [53].

## 2.4 Empirical studies

[54] conducted a study that involved 94 Japanese undergraduate students who were studying English as a foreign language. The objective of the study was to examine the impact of using Mobile-Assisted Language Learning (MALL) on learning vocabulary that was relevant to their writing for three weeks. A comparison between the experimental group of 40 students who used technology in their learning and the control group of 54 students who did not reveal that MALL significantly contributed to L2 vocabulary retention among the experimental group and enhanced positive attitudes towards autonomous learning [54].

Similar results were reached in another study that was conducted to investigate the impact of multimedia-assisted instruction (MAI) on eighty-six students in a junior high school in China who were learning English as a second language. In comparison to the control group, the experimental class showed that MAI improved learners' autonomous learning from low to an intermediate level and helped enhance their reading ability [32].

Additionally, [69], while exploring learners' autonomy in a virtual EFL course on the Moodle platform, found that there was a direct relation between enhanced learner confidence and independent performance and the course design on the Moodle platform and the role of the teacher. Similarly, [15] investigated an online reading out, and learners gained significant improvements in their autonomy in addition to enhanced reading comprehension skills in spite of some technical drawbacks and motivational issues.

In the Palestinian context, [47] studied the impact of Moodle learners' attitudes and language proficiency. The findings showed significant improvements in several language skills for the students in the experimental group compared to those in the control group.

[20] showed that Moodle can enhance metacognitive awareness, which can enhance learners' abilities to make decisions, monitor their progress, reflect, and self-evaluate. This in turn can foster autonomy, confidence, language skills, and motivation.

Finally, [5] examined teachers' perceptions about learners' autonomy and its relation with online teaching. They found that teachers believe that online teaching can provide new avenues to learners and can enhance autonomy. They also believe that teachers play a basic role in facilitating such opportunities.

## 3 METHOD

In this section, the adopted methodology of the current study is detailed and explained thoroughly.

### 3.1 Research design

This study used a mixed-methods approach to answer the main research questions, examining learner autonomy within a digitally supported university environment. The researchers employed a descriptive-analytical method in designing the study. To gain a comprehensive view, quantitative data were collected through a structured questionnaire to explore how technology use in EFL classrooms

affects learners' autonomy compared to traditional, teacher-centered approaches. Qualitative data were gathered through semi-structured interviews to gain deeper insights into students' experiences and perceptions of autonomy-supportive practices. The qualitative techniques involved conducting semi-structured interviews aimed at uncovering:

1. learners' perceptions of the impact of using Moodle-based activities on their autonomy in EFL learning.
2. EFL teachers' perceptions of their role in supporting learners' autonomy through Moodle-based activities and technology.

Combining both datasets provided a thorough understanding of how learner autonomy is practically implemented in line with the university's digital transformation plan.

### 3.2 Instruments and data collection

To answer the research questions, the following tools were used:

- a) A questionnaire was designed to assess how the use of Moodle-based activities in EFL classrooms influences students' autonomy, and
- b) Semi-structured interviews were conducted with the following: a. (15) EFL learners to uncover their perceptions on how technology and Moodle-based activities have impacted their ability to learn independently; b. Semi-structured interviews were conducted with (8) EFL instructors to explore the role EFL teachers have in fostering students' autonomy through using technology and Moodle-based activities in the EFL classroom environment. In addition, the semi-structured interviews aimed at exploring their perceptions of how technology has impacted EFL learners' ability to learn independently.

### 3.3 Context and participants

The study was conducted in the second semester (2024/2025) at a Palestinian university. The sample consisted of (114) B2-level English courses. The researchers followed the random sampling procedures to select 4 sections of (B2) English learners. In addition, this study was conducted as a part of the Department of Languages and Translation's piloting plan for conducting its strategic plan aiming at enhancing the application of digital transformation in teaching and learning foreign languages. Accordingly, the sample was drawn randomly from the piloting sections involved in this intervention.

As for the EFL instructors, the interviews were conducted with (8) EFL teachers who were familiar with using Moodle-based activities in EFL teaching through the Moodle platform and applied the intervention with their EFL sections.

### 3.4 Procedures and implementation

This study was conducted during the second semester of the 2024/2025 academic year at a Palestinian university. Four sections of B2-level EFL learners (114) students

were taught two modules (Unit Two: Education and Unit Three: Medicine). These modules were designed by the researchers in an interactive and digital way and were hosted on the Moodle platform (ITC), engaging students in a digital and interactive environment of learning. The digital and interactive features of these modules included: interactive videos and tutorials, interactive exercises, discussion forums, digital assignments, and progress tracking features. These digital features allowed self-paced learning, access to online resources, visual and practical learning, instant feedback, interactive self-assessment, collaborative learning, self-expression, and self-directed learning.

After teaching students using the interactive and digital modules designed by the researchers, the students continued the rest of the assigned learning material (Unit Five: Architecture and Unit Eight: Aging) in the traditional and conventional style. All the material was delivered in the classroom, based on in-class activities, paper-based assignments and evaluation, in-class group work, and teacher-based feedback.

### 3.5 Data analysis

#### a) Quantitative Analysis

To analyze the results of the learners' survey, appropriate statistical tools (SPSS) were utilized to analyze inferential statistics.

#### b) Qualitative Analysis

Thematic analysis was conducted to identify and categorize the dominant themes from the interviews. The data extracted from the semi-structured interviews were analyzed according to the [9] framework. The interviews' transcripts were read and revised repeatedly to code themes and organize and refine them carefully. The researchers worked collaboratively to validate the themes, and some representative quotations were chosen carefully to support the themes.

### 3.6 Ethical approval

A cohort of seven faculty members of the digital transformation committee at the Department of Languages and Translation, Faculty of Arts, Birzeit University, approved the research proposal and the student questionnaire prior to the implementation of the pilot study. The committee reviewed the research proposal, the research, the instruments, and the implementation. The committee comprises seven PhD and Master's holders with various backgrounds in education, EFL, and Digital content creation.

The primary purpose was to ensure that ethical processes were in place and supported by that institution's ethical guidelines. The study adhered to the ethical standards of Birzeit University, where the research was conducted, and the principles stated in the Declaration of Helsinki, ensuring voluntary participation, confidentiality, and anonymity throughout.

### 3.7 Informed consent

Informed consent was obtained electronically at the beginning of the online questionnaire. Participants were informed about the study's purpose, procedures, anonymity, and voluntary nature before proceeding. Only those who agreed to participate

could access the survey questions. Since participation was entirely anonymous and no identifying data were collected, written consent was not applicable. Concerning the interviews, informed consent was obtained verbally from all participants prior to their inclusion in the interviews. Participants were provided with a detailed explanation of the study's objectives, the voluntary nature of their participation, confidentiality measures, and their right to withdraw at any time without consequence. Verbal consent was deemed appropriate and sufficient because no sensitive personal information was collected, and the interviews posed minimal risk to participants. Moreover, verbal consent ensured participants' comfort and willingness to participate, especially considering potential literacy concerns and cultural preferences. The procedure was approved by a cohort of seven faculty members of the digital transformation committee at the Department of Languages and Translation, Faculty of Arts, and adheres to the relevant institutional ethics committee at Birzeit University.

### 3.8 Voluntary participation

All participants were ensured that they were able to withdraw at any stage of the research without any reservation.

### 3.9 Descriptive statistics of research variables

To analyze the data related to the variables (The Role of Moodle-Based Activities in EFL Learning Environments), we relied on a five-point Likert scale to answer the questions according to the following score: A score of (1) expresses the answer. Strongly disagree, a score of (2) expresses the answer. Disagree, a score of (3) expresses the answer neutral, a score of (4) expresses the answer agree, and a score of (5) expresses strongly agree, and to interpret the arithmetic averages of the study sample members' ratings on each sub-dimension of the study tool, the following equation was use

$$\text{Period length} = (\text{the upper limit of the alternative} - \text{the lower limit of the alternative}) / \text{number of levels}$$

$(5-1)/3 = 4/3 = 1.33$ , so the levels are as follows:

- Low agreement score of (1–less than 2.33).
- Medium agreement score of (2.33–less than 3.66).
- High agreement score of (3.66–5.00).

**Table 1.** Interpreting the arithmetic averages of the study sample sub-dimensions

| Sub-Dimensions                           | Mean | Interpret the Arithmetic Averages |
|------------------------------------------|------|-----------------------------------|
| The use of technology                    | 3.98 | High agreement                    |
| Teacher-Centered Lessons                 | 3.91 | High agreement                    |
| Improvement in Skills and Responsibility | 4.0  | High agreement                    |

As shown in Table 1, the interpretation of the arithmetic averages of the study sample members' ratings on each sub-dimension of the study tool has shown high agreement for the three sub-dimensions.

### 3.10 Reliability of the questionnaire

To verify the stability of the study tool, stability coefficients were extracted using Cronbach's alpha method. Table 2 shows this.

**Table 2.** Cronbach's Alpha values for the sub-dimensions

| Sub-Dimensions                                   | Number of Items | Cronbach's Alpha |
|--------------------------------------------------|-----------------|------------------|
| Using Technology Through Moodle-Based Activities | 7               | 0.794            |
| Compared to Teacher-Centered Lessons             | 13              | 0.889            |
| Improvement in Skills and Responsibility         | 5               | 0.764            |
| <b>Total</b>                                     | <b>25</b>       | <b>0.936</b>     |

It appears from Table 2 that the Cronbach's alpha reliability coefficients were (0.764–0.936), which are high and statistically acceptable values, as studies have indicated that reliability coefficients of (0.70) or above are acceptable coefficients [70].

### 3.11 Construct validity

The validity of the questionnaire was confirmed by distributing the questionnaire to the exploratory sample and then calculating the correlation coefficients between each of the items and the field to which they belong; Table 3 shows this.

**Table 3.** Correlation coefficients between each item of the study tool, the field to which it belongs

|    | Using Technology Through Moodle-Based Activities | Compared to Teacher-Centered Lessons | Improvement in Skills and Responsibility |
|----|--------------------------------------------------|--------------------------------------|------------------------------------------|
| 1  | 0.766**                                          | 0.738**                              | 0.690**                                  |
| 2  | 0.803**                                          | 0.509*                               | 0.841**                                  |
| 3  | 0.842**                                          | 0.774**                              | 0.588*                                   |
| 4  | 0.910**                                          | 0.796**                              | 0.874**                                  |
| 5  | 0.854**                                          | 0.926**                              | 0.928**                                  |
| 6  | 0.857**                                          | 0.913**                              |                                          |
| 7  | 0.794**                                          | 0.891**                              |                                          |
| 8  |                                                  | 0.871**                              |                                          |
| 9  |                                                  | 0.873**                              |                                          |
| 10 |                                                  | 0.858**                              |                                          |
| 11 |                                                  | 0.778**                              |                                          |
| 12 |                                                  | 0.657**                              |                                          |
| 13 |                                                  | 0.797**                              |                                          |

Notes: \*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows that all values of the correlation coefficients between each paragraph of the study tool and the field to which it belongs were statistically significant,

which indicates that the statements that make up the study tool are structurally honest and are considered valid for application to the study individuals [71].

## 4 RESULTS

### 4.1 This part shows the findings of the study's first research question:

Arithmetic means and standard deviations were calculated for the axes of the questionnaire. A paired-samples analysis was conducted for the first axis (the use of technology) and the second axis (Teacher-Centered Lessons). A one-sample t-test was conducted for the dimensions of the third axis (Improvement in Skills and Responsibility), which consists of the dimensions (Responsibility, Flexibility, and Independence). The effect size was calculated for each dimension of the third axis.

#### How does the use of technology in EFL classrooms and teacher-centered lessons influence learners' autonomy at a statistical level $\alpha = 0.05$ ?

To answer the research question, the following steps were taken:

##### Step One:

Null Hypothesis: There is no statistically significant difference at the significance level  $\alpha = 0.05$  in student performance between Teacher-Centered Lessons and the use of technology.

The questionnaire was administered to the same sample to measure Teacher-Centered Lessons and the use of technology, and a paired sample t-test was used.

**Table 4.** Descriptive statistics

|  |                          | Mean | N   | Std. Deviation | Correlation Co-Efficient |
|--|--------------------------|------|-----|----------------|--------------------------|
|  | The use of technology    | 3.98 | 114 | 0.59           | 0.80                     |
|  | Teacher-centered lessons | 3.91 | 114 | 0.61           |                          |

Table 4 shows the descriptive statistics for the variables. The arithmetic mean for the dimension "the use of technology" was 3.98 with a standard deviation of 0.59, while the arithmetic mean for the dimension "Teacher-Centered Lessons" was 3.91 with a standard deviation of 0.61. The correlation coefficient between the two dimensions was 0.80.

**Table 5.** Paired samples test for (the use of technology and teacher-centered lessons)

|                                                     | Paired Differences |                   |                    |                                                 |         | t     | DF  | Sig.<br>(2-Tailed) |
|-----------------------------------------------------|--------------------|-------------------|--------------------|-------------------------------------------------|---------|-------|-----|--------------------|
|                                                     | Mean               | Std.<br>Deviation | Std. Error<br>Mean | 95% Confidence<br>Interval of the<br>Difference |         |       |     |                    |
|                                                     |                    |                   |                    | Lower                                           | Upper   |       |     |                    |
| The use of technology –<br>Teacher-centered lessons | 0.074              | 0.38              | 0.035              | 0.00466                                         | 0.14398 | 2.114 | 113 | 0.037              |

The results in Table 5 indicate the rejection of the null hypothesis. The Sig. value was 0.037, which is less than the statistical significance level  $\alpha = 0.05$ . Since the mean difference value was 0.074, the difference was in favor of the use of technology in learning.

**Step Two:**

The third domain, related to the role of technology use in “Improvement in Skills and Responsibility,” consists of three dimensions: Responsibility, Flexibility, and Independence.

To determine which dimensions were statistically significant, the following hypotheses were formulated:

There is no difference in the mean student responses for the Responsibility dimension from 3 at the statistical significance level  $\alpha = 0.05$ .

There is no difference in the mean student responses for the Flexibility dimension from 3 at the statistical significance level  $\alpha = 0.05$ .

There is no difference in the mean student responses for the Independence dimension from 3 at the statistical significance level  $\alpha = 0.05$ .

The value 3 corresponds to (neutral) in the student responses on the questionnaire.

**Table 6.** One sample t test for (Responsibility, Flexibility, Independence) at statistical level  $\alpha = 0.05$

| Dimension      | Mean | S.D  | t     | Sig   | Effect Size | Interpretation  |
|----------------|------|------|-------|-------|-------------|-----------------|
| Responsibility | 3.97 | 0.74 | 13.93 | 0.001 | 0.75        | Positive effect |
| Flexibility    | 3.96 | 0.73 | 13.98 | 0.001 | 0.73        | Positive effect |
| Independence   | 4.16 | 0.91 | 13.62 | 0.001 | 0.91        | Positive effect |

As shown in Table 6, the results of the one-sample t-test reveal that all autonomy items scored significantly higher than the neutral value of 3, indicating positive student perceptions regarding the Moodle platform activities in enhancing learner autonomy. The highest mean was recorded for Independence from the teacher, reaching 4.16, followed by Responsibility with an arithmetic mean of 3.97, and finally Flexibility in learning and the ability to review difficult concepts with an arithmetic mean of 3.96. The effect size value for the impact of technology use on learner autonomy was 0.91, which is high, indicating a strong effect of technology use on learner autonomy. This was followed by the effect size of technology use on taking responsibility in learning, which was 0.75, also indicating a strong effect of technology use in learning on taking responsibility. Finally, the effect size value for the impact of technology use on flexibility in learning and the ability to review difficult concepts was 0.73, which is also a high value, indicating a strong effect of technology use on flexibility in learning and the ability to review difficult concepts. It can be concluded that the use of technology has a significant and positive impact on learner autonomy.

## 4.2 Findings of the second research question

**In this section, thematic analysis was conducted to find out:**

**What are students’ perceptions of the role of technology in fostering learner autonomy in EFL learning environments?**

To uncover students’ perceptions, semi-structured interviews were held with 15 students. The researcher carried out thematic analysis, and based on that analysis, the following themes were extracted.

### a) Moodle-Based Activities as a Tool for Self-Management, But Not Full Independence

Respondents asserted that Moodle-based activities have assisted them in managing their learning through providing access to online materials. Moreover, they

added that setting deadlines and tools for progress tracking provided more control over learning time. One student said, *“Moodle-based activities have made me more responsible and organized.”* Another one added, *“Having everything available in one system improves time management and helps me stay focused on my academic goals.”* Nevertheless, three respondents highlighted their need for their teacher’s clarification and explanation once needed. One student said, *“Moodle supports me, but doesn’t replace the guidance I get from my teacher.”*

**b) Moodle-Based Activities Effectiveness Depends on Task Interactivity and Feedback**

Participants are assured that interactive and rich feedback exercises, including fill-in-the-blanks, quizzes, and speaking tasks, have encouraged active engagement and enhanced contextual understanding. They also asserted that repeated practice and immediate feedback have strengthened learning motivation and vocabulary retention. One of the respondents said, *“This helps me know what I understand and what I need to go back to. Also, it gives me space to answer confidently not worrying about being wrong, sometimes I feel more comfortable doing that online than in class.”* However, the interviewed students expressed that passive tasks like listing items were not as effective as other tasks.

**c) Moodle Promotes Responsibility Through Availability and Flexibility**

Interviewed students have confirmed that Moodle-based activities were effective in increasing their initiative towards learning. This was evident through an increased tendency towards rewatching the online material and lectures and creating their learning material through online resources. Three of the interviewed students assured that Moodle-based activities have also encouraged them to identify their language weaknesses and, therefore, design their personal study plans. One student said, *“I can easily identify areas of weakness (whether in grammar rules or vocabulary), which helps me take early action to address them.”* They have become more aware of when and how to interact with the online material.

**d) Clarity of Instructions and Workload Pressure May Affect Learning Quality**

Interviewed students agreed that there are some challenges that have affected their experience with Moodle-based activities. These include, first, technical problems related to unstable internet connections. In addition, they faced some difficulties in managing their time due to overlapped study tasks and numerous assignments. One student said, *“Moodle is supposed to help with self-learning, but when there’s too much pressure, it turns into a race to meet deadlines.”*

Two students mentioned confusing instructions that led to initial uncertainty. One student said, *“Sometimes I felt confused about what exactly I had to do, because the instructions weren’t always very clear or detailed.”* However, this disappeared due to group work and teacher support. *“But over time, I started asking more questions and double-checking things, which actually helped me take more responsibility.”* Finally, two students added that they were concerned that there was a mismatch between the level of difficulty of these activities and the in-class exams, which could affect confidence.

**e) Interactive Moodle Tasks Can Enhance Skills and Performance**

Interviewed students agreed that Moodle-based activities have enhanced their language skills, especially listening, speaking, and vocabulary comprehension and application. This in turn has affected their academic performance and enhanced their communication skills. A student said, *“Completing Moodle-based activities has influenced my academic performance in several ways, particularly through certain types of exercises. The speaking tasks, where I record presentations or audio responses, have significantly improved my communication skills and grades in oral*

assessments". They also agreed that doing and practicing doing online activities and tasks has helped greatly minimize stress and anxiety and boosted confidence and familiarity when they had online exams. Finally, interviewed students confirmed that they started having more control over their learning due to enhanced autonomy. One student said, *"Before, I was more used to being guided step by step, but now I'm more used to managing my studies myself."*

### 4.3 Findings of the third research question

**In this section, thematic analysis was conducted to find out What are teachers' perceptions of the role in supporting EFL learners' autonomy through technology?**

To uncover teachers' perceptions, semi-structured interviews were held with eight EFL teachers who conducted the intervention of Moodle-based activities with their students throughout the semester. Thematic analysis was carried out to find their perceptions of their role in fostering EFL learners' autonomy, and the following themes were extracted.

#### a) Moodle as a Tool for Fostering Autonomy and Problem-Solving

In answering the first question about their opinion of using Moodle, the EFL instructors asserted that they have felt that for enhancing learners' autonomy, Moodle-based activities were found more effective and powerful than the conventional way of handling tasks. They justified that this is due to several reasons, including the personal pace that is provided to learners to work and access the online resources. They also felt that the interactive tasks and activities can enhance learners' critical thinking and problem-solving skills. Therefore, they confirmed that when compared to traditional teacher-centered classroom instruction, Moodle has been found to be a flexible approach that gives more space for EFL learners.

#### b) Feedback as a Means of Building Responsibility

The instructors asserted that to foster their positive and constructive role in enhancing their learners' autonomy, they had to be keen to provide constructive feedback regularly. One instructor said, *"I felt that my students needed individualized feedback each time they would complete an online task on Moodle. They were eager to read my notes I used to provide for each one of them"*. The other instructor added, *"My students waited eagerly to read my feedback as they felt this would uncover their strengths and weaknesses and helped them get improved next time."* She added, *"Feedback, either comments or grades with comments, has helped my students track their progress and had the feeling of pride and ownership over their independent work."*

#### c) Supporting Struggling Students in Developing Autonomy

The instructors agreed that it was essential to follow up with all students at the beginning of the intervention and keep following up with some struggling students every time they needed that help. Step-by-step demonstrations and technical support were fundamentally vital for the effective success of using Moodle. One instructor said, *"Regular checks and one-to-one support have helped foster learners' confidence and enhanced their autonomy."*

#### d) Encouraging Out-of-Class Enhanced Autonomous Learning

The instructors agreed that it was essential to follow up with students outside class to maintain a sense of responsibility and encouragement. They had

followed several strategies, including messages on the university electronic platform of Ritaj, deadline reminders on the Messenger and What's App groups, and initiatives for early submissions (extra grades or compliment notes). In addition, the instructors confirmed their encouragement of peer collaboration and group work in doing the online tasks, especially the speaking tasks (debates and dialogues). They felt that such collaboration has enhanced learners' work and empowered their confidence and autonomy. One instructor said, *"An effective strategy was asking students to work in groups for one of the assignments. This peer collaboration technique enhanced students' sense of responsibility and autonomous learning."*

#### e) **Structuring Moodle Activities for Self-Directed Learning**

Finally, the instructors confirmed that one crucial key in supporting students' autonomous work is by providing well-structured activities on Moodle. This involves clear and simple instructions, clear objectives, model answers, tutorial videos, and allowing the choice of different topics for students when possible. This would increase learners' motivation and give a sense of ownership of their learning. The instructors suggested allowing reflection opportunities for students to help them highlight their strengths and identify where to improve. All these strategies would enhance self-directed learning and autonomy.

## 5 DISCUSSION OF THE RESULTS

### 5.1 Discussion of the results of the first research question

This section addresses the first research question:

#### **How does the use of technology in EFL classrooms and Teacher-Centered Lessons influence learners' autonomy at a statistical level $\alpha = 0.05$ ?**

The quantitative data reveal three main dimensions that relate to learner autonomy: improvement in skills and responsibility, using technology through Moodle-based activities, and reduced dependence on the teacher.

Drawing on the data presented, participants demonstrated their endorsement of technological integration due to its potential to enhance learner autonomy, foster ownership and responsibility, offer flexible learning opportunities, and reduce dependence on traditional teacher-led instruction. The findings reflect a preference for the use of Moodle-based activities in EFL learning environments, which positively influences learners' autonomy as active agents of change, as teachers assume critical responsibilities. These results align with [67] and [26], who assert that promoting technology-enhanced autonomous language use will aid learners in self-directing and personalizing their learning.

As shown in the results, the role of Moodle-based activities in EFL learning demonstrated a substantial impact of using technology in EFL classrooms. These findings resonate with earlier research by [22] and [36], who emphasized the transition from receptive, non-agentive roles to proactive constructors of understanding. Such tools could also enhance learners' engagement by providing them with real-life interaction in digital environments [57].

The results also marked an enhancement in the refinement of competencies and an enhancement in self-regulatory engagement with Moodle-based activities. Increased capacity for autonomous decision-making when utilizing technological tools is supported by [48] as learners develop self-discipline and efficiency while learning as responsible and autonomous knowledge producers.

These findings further underscore the students' ability to gain a sense of responsibility, improve their problem-solving skills, promote independence, and have flexibility in learning time. This outcome highlights the significance of reprocessing cognitively demanding material, heightened awareness of personal accountability, strategic reasoning and adaptive resolution capacities, autonomous learning reasoning, and temporal adaptability within individual educational pacing. This finding is supported by [68] and [30], who stress the value of critical reflection and social interaction.

Additionally, in line with [19], learners consider Moodle-based activities highly effective in promoting autonomy, providing access to resources and employing interactive tools within a structured pedagogical support, encouraging self-regulated task execution, and facilitating personalized progression through flexible instructional timelines.

The results reveal that learners prefer to implement learner-specific customization of pedagogical content and delivery. This enables learner agency in selecting instructional modalities and content, selecting the timing and strategies most suitable to their learning preferences, and making informed selections regarding curricular focus and thematic exploration. This virtual hub fosters independence and self-directed learning, which are key principles of autonomy [48]. These findings are supported by [75], [58], and [3], who believe that learners can self-regulate their learning and take charge of their decisions while learning. Moodle-based activities help learners adapt and scaffold their self-autonomy depending on their personal needs while accomplishing tasks [48]. These findings are supported by [30], who argues that the context, social factors, and motivation help in achieving better learner autonomy as they reflect growth in self-regulation, time management, and decision-making.

The data yielded a positive impact of the use of Moodle-based activities, reflecting a prevailing trend within the sample. The beneficial contribution of Moodle-based activities reflects an expanded capacity for independent learning, an intrinsic drive for academic engagement, and autonomy in determining task-related content [64], [33]. However, logistical aspects related to material access and improved learning schedule management reflected a modest decline compared to the other measured components, indicating a potential need for improvement. This could be attributed to [66], [6], and [59], who emphasize that using technology and authentic digital tools can aid learners in accommodating their learning styles.

Responses from participants indicate generally positive perceptions in learner behavior. This highlights that learners consider Moodle-based activities significant in promoting their ability to learn independently, which in turn affects their level of motivation. Therefore, learners can navigate Moodle-based activities that grant them greater agency concerning their learning preferences and goals and facilitate instructional responsiveness to learner variability within an environment that foregrounds student agency and voice. These results align with previous research [36], [53], [57], [67], which highlights the importance of facilitating learner development towards self-directed academic exploration and fostering independent language acquisition via educational technologies within personalized and interactive environments.

Furthermore, results indicate that technology plays a vital role in motivation as a crucial factor for language learning. This is supported by previous studies on how employing digital tools enhances motivation, collaboration, and interaction [52], [24]. Results reveal that during Moodle-based activities, learners grasp a sense of understanding and accomplishment of learning tasks as they are motivated to learn and

discover how they are learning [55], [45], [48], [12], [63]. As for opportunities for reflection, results ( $M = 3.90$ ) reflect significant support for metacognitive engagement through Moodle's features such as quizzes, interactive exercises, videos, blogs, and quizzes. These technology-mediated functionalities advance student ownership of the learning process [44]. Thus, learners' favorable perceptions of deep reflective practices should be endorsed and supported with enhanced scheduling tools and scaffolding within digital platforms [33], [53], [58], [64].

The increased independence from teachers received the highest mean score ( $M = 4.16$ ), implying that learners generally felt more autonomous and confident in their learning compared to traditional teacher-centered methods. This positive outcome aligns with previous studies (e.g., [48]) emphasizing learners' capability of taking control of their learning compared to the teacher-centered lessons. These results align with the core objectives of blended or technology-enhanced learning environments [45], [12], suggesting that learners can take greater initiative and self-oriented learning with reduced reliance on direct teacher guidance [53].

Furthermore, results indicate a reduced dependence on the teacher through the integration of Moodle-based activities, guiding learners to rely less on direct intervention from instructors. Learners depended more on their initiative, which cultivates confidence, ownership, and a sense of responsibility towards learning [63], [40], [33]. Compared to teacher-centered lessons, students demonstrated the ability to strategically manage their personal learning process with flexibility while tracking their progress and monitoring their personal academic growth. Such observations align with previous studies [38], [51], showing that EFL learners can track, initiate, and critically assess their learner-centered developmental cycle due to the favorable outcomes of LMS platforms on learner autonomy.

Furthermore, results reveal that academic outcomes could be enhanced when Moodle-based instructional tasks are reinforced by co-constructed learning experiences. This would grant learners the opportunity to review and manage learning tasks. To support this claim, [52] consider engagement, motivation, and collaboration to be key factors in the success of digital environments. This would promote social autonomy and create a shared responsibility among learners [36].

To conclude, the findings of the research's first question reveal that while traditional classrooms still hold value, especially for structure and guidance, technology in EFL classrooms influences learners to take control of their learning as a self-directed process.

## 5.2 Discussion of the results of the second research question

This section addresses the second research question:

### **What are students' perceptions of the role of technology in fostering learner autonomy in EFL learning environments?**

According to the findings, students have shown positive perceptions towards the use of technology in general and Moodle-based activities in particular. They have perceived platforms like Moodle as a powerful force that can enhance their autonomy in learning English as a foreign language. These findings go in line with previous studies, which confirmed that technology and platforms like Moodle can increase learners' control over pace, time, and learning resources [15], [69]. These positive perceptions can also be attributed to the fact that technological tools and platforms like Moodle were proven to enhance metacognitive awareness for learners, including reflection, self-evaluation, and self-monitoring [20]. In

addition, the positive attitudes that have been shown in the interviews are also related to Moodle's positive impact on specific language skills when activities are properly structured, which aligns with [47]. To conclude, students generally have positive attitudes towards technology use in foreign language learning contexts. They perceive it as a strong enabler for their language skills and autonomy; they also feel that it has a positive impact on their confidence, self-esteem, and motivation. However, they feel that all this is strongly linked to course structure, activity design, and teachers' support.

### 5.3 Discussion of the results of the third research question

This section addresses the third research question:

#### **What are teachers' perceptions of their role in supporting EFL learners' autonomy through technology?**

It is evident that teachers have shown positive perception towards technology in EFL teaching; they have also stressed the importance of their role in enhancing students' active engagement and autonomous learning in the technology-assisted learning process. This strong sense of their role in supporting EFL learners' autonomy is attributed to viewing their role as fundamental in guiding learners, supporting and scaffolding them, and designing well-structured activities and Moodle-based courses. Teachers are also fully aware of their basic role in providing constant support and guidance and its impact on learners' motivation, sustainable autonomy, and better academic achievement. This aligns with [69] and [5]. Therefore, they confirmed that while technology can open new opportunities in fostering autonomy, their role will remain indispensable in guiding their students, designing well-structured and interactive online tasks and providing constructive feedback and support.

## 6 CONCLUSION

In conclusion, this study found out that technology and technological platforms can play a significant role in fostering EFL learners' autonomy. In addition, platforms such as Moodle and Moodle-based activities can help learners enhance their language skills, leading to more academic engagement and better academic achievement. The study findings also demonstrated positive attitudes and perceptions of EFL learners towards using Moodle-based courses and activities in comparison with traditional teacher-centered approaches. However, the learners ensured that for positive outcomes to be achieved, teachers should remain as enablers and constant supporters to their students. They should provide constructive feedback and design well-structured activities that can empower learners' autonomy and get them engaged actively in the learning process. EFL teachers also recognized their basic role in fostering learners' autonomy through Moodle-based activities. They confirmed that they should be active facilitators who help students scaffold and work independently through well-organized and well-structured tasks to enhance self-directed learning. They should also contribute actively by providing in-time feedback and constant guidance and support. Aggregately, this study's outcomes showed undeniable agreement between the integration of technology, especially Moodle-based activities, and the empowerment of learners' autonomy in teaching English as a foreign language in the Palestinian context.

## 7 PRACTICAL IMPLICATIONS

Based on the findings of this study, the following implications are suggested by the researcher:

- a) Curricula designers should intentionally integrate tasks and activities that are technologically driven. For examples, they can design mobile applications and multimedia tasks that are installed and activated on online platforms such as Moodle. This systematic integration can encourage active and sustainable use of technology and can in turn empower learners' autonomy in the learning process.
- b) Universities and Higher education institutions should equip teachers with necessary professional development by organizing regular workshops to enhance teachers' technological literacy and upgrade it continuously. Teachers can be great facilitators and creative designers if they have the necessary professional technological knowledge needed.
- c) Similarly, students should receive necessary technological literacy to obtain the essential knowledge needed in utilizing online platforms and related online tasks. This can be acquired through regular and systematic technological support for learners. When students are technologically well-informed, teachers can guarantee active and positive interaction between learners and technological learning tools and platforms. This in turn will have a positive alignment with empowered autonomy and better academic achievement.
- d) Finally, it is essential for all Higher education institutions to equip their universities and colleges with all the necessary infrastructure for active and sustainable technological utilization. Hence, it is highly recommended to recruit a well-trained staff that can deal with technical problems and keep the technical infrastructure updated and maintained. This will guarantee that blended and online approaches are activated and well used in all cases, not just in times of unrest and uncertainty (health, political, or security cases), leading to fostering autonomy in learning in all circumstances.

## 8 STUDY LIMITATIONS

This study is constrained by the following limitations:

First, the study sample was selected from the sections taught by the researchers as a convenience sample, which may limit the generalizability of the research findings to EFL learners in broader contexts. Second, the study was conducted within a limited time frame (during one academic semester). Longer exposure to Moodle-based activities may reveal different outcomes. Finally, the study was limited to using one technological tool (Moodle) within a specific institutional context, which may limit the study's findings to other technological tools in different institutional contexts.

## 9 ACKNOWLEDGEMENT

The authors express their sincere gratitude to all those who have supported and contributed to the completion of this study. We are grateful to the participants of this study, whose willingness to share their experiences and perspectives was crucial to the success of this project.

## 10 FUNDING STATEMENT

The authors did not receive any specific grant or financial support from funding agencies in the public, commercial, or not-for-profit sectors for the conduct of this study. This study was carried out independently without any external funding.

## 11 DATASET REPOSITORY

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## 12 DECLARATION OF INTEREST STATEMENT

There are no conflicts of interest associated with the other authors or institutions. This is a self-funded, self-initiated study with other coauthors.

## 13 DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors disclose that an AI tool was used solely to assist with formatting the reference list according to IEEE style. No AI tools were used to generate, analyze, interpret, or write the scientific content of the manuscript. The manuscript was written entirely by the authors, who take full responsibility for its content and accuracy.

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